

**Reading to Learn: The role of metacognition in reading  
comprehension and academic achievement of students with learning  
disabilities**

An Honors Thesis (HONRS 499)

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A handwritten signature in black ink, appearing to read "D. Karen Thatcher", is written over a horizontal line.

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### **Abstract**

The purpose of this paper is to examine the impact of metacognition on reading comprehension and academic success in students with learning disabilities. The paper includes information on metacognition and reading, metacognitive reading strategies used by effective readers, reasons why students with learning disabilities are often not effective readers, and various approaches to teaching metacognitive strategies to students with learning disabilities. Also, the necessity of good metacognitive skills in life outside of reading is briefly discussed. The information covered in this paper suggests that metacognition plays a big role in reading comprehension and overall academic success of students with learning disabilities, and that improving the frequency and accuracy with which these skills are applied will result in increased performance in both domains.

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## **Part I: My Personal Journey**

### *A metacognitive analysis of my own academic development*

Being a senior in the Honors College can be daunting. Not only are you busy applying to graduate schools and planning your future, you also must write your senior Honors thesis, a task often so overwhelming it is almost always best to avoid thinking about it. After years of dreading and avoiding commitment to a semester long project, an idea was handed to me on a silver platter in the form of a 16-year-old with a reading comprehension problem. As I began to research reading comprehension for my client at the Ball State Speech-Language Clinic, I came to an important realization. As I look backed back over my college career, I realized that there has been one skill that I have never been explicitly taught, but that I have used every day. It has helped me to achieve the success I have had in college, improving my reading, critical thinking, and self-help skills.

Metacognition, or being able to think about thinking, has been at the core of my education all along, and I, like most college students, never noticed it.

As I began my first semester of college with an Honors Humanities class, I was delighted to learn that we would be evaluated on our journals instead of by formal tests. As a high school student, I had always enjoyed the opportunity to “journal” for my English classes. Not only was it much less stressful than writing a formal paper about the stories we were reading in class, it provided time to think about all the things I would never have time to think of in the middle of class discussion. While I was uncomfortable sharing my comments with the rest of the class, I enjoyed being forced to think about what I was reading. Reading

Greek and Roman classics can be quite dull if you are just reading for content or memorizing details for multiple choice tests, but it was all of the background information that could be applied to the material, the way these myths and plays still make their marks thousands of years later, and the similarities to modern day experiences that made these texts interesting to read and analyze. Not only did I write down my thoughts, I received good comments back about them.

While I didn't realize it at the time, I was being reinforced for using metacognitive reading strategies without being forced to talk. Little notes like "I didn't understand this," "I liked this passage a lot," or "I wonder what he meant when he said that," while seemingly simple and unremarkable, are actually evidence of use of metacognition and reading strategies that have been proven to increase reading comprehension, vocabulary, problem solving skills, and overall educational success.

As I continued through college, the metacognitive analyses required of me became more demanding, but surprisingly less difficult. Although I have rarely had problems noticing my own flaws, activities requiring me to evaluate my own performance during interaction with clients in the BSU speech-language clinic required me to recall how events had played out and analyze them in terms of what I knew was expected of me. Peer-review presentations for my linguistics classes and essays describing my reactions to cultural events such as plays, speakers, and films required me to not simply recall my actions, but instead recall my thoughts on other's presentations. Finally, clinical experiences required me to analyze my actions, thoughts, choices, and those of my client, make predictions about ways to help the client learn new skills, and come up with effective therapy

plans and goals. Had I never learned the important skills of recalling, analyzing, and basically thinking about my own thought processes through the journaling activities of my high school years, I wonder if I would have been as well prepared for the arduous tasks of metacognitive analysis required of me as I progressed through college.

It is for several reasons that I decided on this topic for my Honors thesis. Firstly, I hope to become better prepared to aid my current client in improving her reading comprehension. Secondly, I hope to become better prepared to help others understand the importance of metacognition. And finally, I hope to become better prepared to encourage metacognitive development in those who struggle with this critical skill, particularly those with learning disabilities.

## **Part II: Literature Review**

### *What is Metacognition?*

Metacognition is commonly defined as “thinking about thinking.” While this definition is accurate, it does provide us with all the information we need to determine if this skill is indeed a steppingstone to academic success for students with learning disabilities. Pressley (2002) offers a more specific definition, stating, “Metacognition is knowledge of thinking processes, both knowledge of the thinking occurring in the here and now and in the long term.” This definition provides better starting point from which to approach the topic of metacognition. A particular strength of this definition is its distinction between “here and now”

and “long term” processing, which allows us to break apart the process of “thinking” into more specific processes and examples.

Here and now processing includes analyzing and interpreting the world around you as you view it. It may include identifying difficulties with certain situations, checking answers, figuring out errors. In math class, a student using here and now metacognitive processing might reason through a story problem thinking, “Ok, this answer doesn’t seem to check out. I don’t think I understand how to do these problems correctly.” While reading, a here and now processing could include, “I am not sure what the word fluctuates means. I am going to read that sentence again.... The temperature fluctuates a lot throughout the year... Maybe fluctuates has something to do with changes.... Yeah, that sounds right. The temperature changes a lot throughout the year.” In essence, here and now processing involves monitoring comprehension, noticing areas of confusion or misunderstanding, and attempting to resolve comprehension problems that arise.

Long term processing is related to planning for future problems. Where here and now processing involves *thinking*, long term processing is closer related to *knowing*. Knowledge of specific reading, outlining, writing, and self-help strategies is the main goal of long term processing. Also, students must realize that these skills must be actively used if they are to be helpful.

### *How Does Metacognition Relate to Reading?*

In order to understand how metacognitive reading strategies relate to school success, one must first understand what reading is and how it develops.



Catts and Kamhi (1999) discuss the struggle for researchers and practitioners to define reading. Specifically, they examine three definitions of varying specificity.

The broadest definition was offered by Gates in 1949. According to Gates, reading should be defined as “a complex organization of patterns of higher mental processes...[that]... can and should embrace all types of thinking, evaluating, judging, imagining, reasoning, and problem-solving.” Catts and Kamhi (1999) acknowledge that this view of reading is widely accepted, but they argue that it describes reading as a developmental process as opposed to a skill itself. Also, the “higher thinking” processes Gates uses to describe reading can all be performed by illiterate individuals.

A second definition discussed by Catts and Kamhi (1999) is the “narrow” definition. According to this definition, reading consists only of the process of decoding. Crowder (1982) compares the skill of learning to read to learning to read Braille. He argues that researchers studying how a person learns Braille would not investigate how the person translates what he or she has decoded into mental images and ideas. Instead they would focus on how that person learned the Braille symbols and how they combine them to decode the texts they are presented with.

Catts and Kamhi (1999) then discuss the “simple” definition of reading as proposed by Gough and Tunmer in 1986 and Hoover and Gough in 1990. This definition combines Gate’s broad definition focusing on higher processing with Crowder’s narrow definition focusing solely on decoding. According to this definition, reading can be described in two main processes. The first process is decoding, whereby the individual translates the text on the page into

understandable sounds and words. The second process is comprehension, whereby the individual gives meaning to the words they have decoded.

Catts and Kamhi (1999) suggest that these different definitions may be applied differently to different stages in reading development. They believe that, while the “narrow” definition may work well with individuals who are just learning to read who must learn to decode what they are reading, the “simple” definition which incorporates comprehension of text may be applied to more advanced readers and may help explain certain reading disabilities. In this article will be discussing both the development of decoding skills by early readers and the metacognitive processes used by highly effective readers. For this reason, we will be using Gough, Hoover, and Tunmer’s definition of reading, which includes reading both decoding and reading comprehension.

### *A Brief Introduction to Reading Development*

Reading is a skill that most individuals develop as young children. However, unlike learning to speak, learning to read is an intricate process that does not occur naturally. Because of the complexity of the task of learning to read and because of the fact that instruction is necessary for a child to learn to read, it is important for parents, teachers, and other professionals who work with children understand the process of learning to read occurs.

The first period of reading development is emergent literacy. This occurs between birth and when the child begins formal schooling. During this time, children learn that language has meaning, and their expressive and receptive language skills emerge and develop. Their vocabulary increases, their

pronunciation and articulation of words improves, and they are able to understand more complex sentences and concepts.

Also during this time, children are exposed to books and learn to enjoy or dread reading. They may assist in turning the pages, look at pictures, and even hold the books. Many children learn their letters before their formal education begins, although they may not understand how to use them, and they begin to play with language, enjoying rhyming, rhythmic, and repetitive stories (Sousa, 2005). It is important for the child to develop these skills and interests before he or she learns to read, as they form the basis of all that is to follow. Studies have shown that emergent literacy skills are an excellent predictor of reading success later in life.

There are several specific concepts that are important for children to understand towards the end of the emergent literacy stage and the beginning of the early literacy stage. The initial language concept that children need to understand in order to have reading success is alphabetic principle. Understanding the alphabetic principle simply means that the child understands that letters written on a page have sounds that they represent. They may begin by singing their ABCs or they may be explicitly taught their letters by parents or teachers, but eventually they come to understand that letters are how we write and read words. While the alphabetic principle is essential for an emergent reader to acquire, it is not sufficient to help them cross the bridge to reading.

Secondly, children must possess phonological awareness. According to Sousa (2005), phonological awareness is simply the understanding that our language can be broken down into smaller units. Sentences can be broken down

into words. Words can be broken down into smaller groups of sounds (syllables). And syllables can be broken down into individual speech sounds (phonemes). Children who are just discovering this principle are beginning to understand that words can be “played around with.” They begin to understand that words can rhyme, and notice that similar sounds appear in different words.

The final skill needed for reading development is a sub-area of phonological awareness called phonemic awareness. Sousa (2005) describes phonemic awareness as the ability to understand that words are made of individual sounds (phonemes) that are not specific to that word. For example, the /k/ sound in the word [kæt] (“cat”) can also be used in [kʌt] (“cut”) or in [pɒk] (“poke”). As children become more skilled in phonemic awareness, they begin to be able to label the first, middle, and last sounds of words, and they become able to divide words into phonemes (e.g. “cat” → /k/ + /æ/ + /t/) and combine phonemes into words (e.g. /k/ + /æ/ + /t/ → “cat”). Sousa notes that books containing rhyme and alliteration can be used to encourage the development of phonemic knowledge.

All of these skills make it possible for a child to *decode* textual information, and it is important for practitioners and researchers to remember that delays or deficits in any and all of these early developmental skills can impact text comprehension. This is because decoding and comprehension both require the resources of short-term memory. The more difficulty a child has with decoding, the less of their short-term memory they will be able to devote to applying metacognitive strategies to improve comprehension (Pressley, 2002).

In addition, poor word recognition skills make decoding more difficult. When children are not able to quickly identify words, they must actively try to sound out a word instead of devoting attention to reading for comprehension. Pressley (2002) summarizes this idea by stating, “The nonfluent reader is thinking about the sounds of the individual letters and letter combinations while trying to blend them. When this is the case, there is not much capacity left for comprehension, either of the individual words being read or for understanding the sentences, paragraphs, or whole text being read.”.

However, even if a child is able to decode, it does not mean that he is able to comprehend what he is reading. Decoding can provide a literal interpretation of the words on a page, but true reading comprehension requires more complex skills such as predicting, making inferences, interpreting, analyzing, and looking at the text from the perspective of the character or the author. These tools of analysis that facilitate reading comprehension require an important skill that is rarely taught but that is necessary for academic success: metacognition.

### *What Metacognitive Skills do “Good Readers” Use?*

Wilhelm (2001) explains the process of effective use of metacognitive reading strategies by saying, “the hallmark of an expert reader is that she actively and continually makes meaning as she reads. Whether reading a thirty-two page picture book or a seven hundred page Russian novel, an expert reader brings meanings forward as she reads each page and uses these meanings to inform her understanding of the unfolding text. She is eminently aware of when her meaning-making begins to break down and has strategies to repair faltering

comprehension.” Researchers agree that good readers use ten major metacognitive processes to increase reading comprehension (Wilhelm, 2004). These skills typically develop simply through the process of reading text after text and are rarely specifically taught in schools. According to Brian Laedwig (n.d) from the Greece Central School District, application of these skills is generally done implicitly by good readers, but must be explicitly taught to struggling readers.

One metacognitive skill used by good readers mentioned by Wilhelm (2004) is making predictions about the text. Predictions can be made even before reading starts. The title, cover art, and back cover summary of a book may give the reader a better idea of what to expect while reading. Also, a table of contents or chapter headings may provide clues to what will happen in the story. While progressing through the story, good readers create hypotheses about what will happen next based on the information they already have. As they continue to read, these hypotheses are modified to fit what is actually happening in the story. This skill provides a framework for the reading process. Instead of trying to figure out the text as a whole *after* reading it, making and adjusting predictions allows the reader to analyze the text *while* reading.

Another metacognitive process used by skilled readers is activating prior knowledge. When skilled readers approach a text, they bring with them all the background knowledge they have that relates to the text. Knowledge of characters might have been gained from the cover or from reading other books containing descriptions of the characters. Historical information that a reader learned in history class could be applied to fictional or non-fictional texts to

provide a better mental picture of the text's setting or the characters' mindsets. Knowledge of an author's views or writing style can also serve as a filter through which material can be examined. Also as they read, skilled readers make personal connections to the text and relate the story to their own experiences and thoughts, using their own experiences to help them get in the mindset of the character or author by using. The reader may have faced a similar situation or may be able to place himself in the mindset of a character in the story. Asking questions such as "What would I do in this situation?" or "How would I feel if this happened to me?" are excellent ways of thinking about the text in relation one's own life. Not only does this strategy help to make the story more interesting, it also helps with making predictions.

Thirdly, good readers set a purpose, reason, or goal for reading. This purpose influences how many strategies the reader utilizes based on how the text will be used. If the text will be tested over, perhaps the reader should pay closer attention to possible test questions. If the text will be used as a source for a research paper, perhaps the reader should highlight important information for later use. And if the text is just being read for fun, the reader will only need to make use of as many strategies as he feels is necessary to allow for enjoyment of the story.

Decoding text into words and meanings is a very commonsense skill that many poor readers often skip over. While a form of decoding related to figuring out a word's meaning by combining the letters and sounds it is made of was discussed previously, the metacognitive skill of decoding involves recognizing unknown or misunderstood words and sentences and using outside knowledge to

figure out their meanings. Using knowledge of prefixes, suffixes, and root words as well as actively using the context of the sentence to figure out what a word might mean can greatly impact reading comprehension, especially when the key words of a sentence are unfamiliar to the reader. Also, breaking a paragraph into a main idea and supporting sentences may help a reader understand why an author wrote a particular sentence and how that sentence relates to the authors purpose as a whole. A good reader must use “here and now” processing to determine when key words or sentences are not understood and then must apply decoding strategies appropriately.

Visualization, or creating mental pictures while reading, is another strategy that highly effective readers use. Sousa (2005) states that readers who use this strategy understand and remember what they read better than those who do not. These mental pictures created may include concrete images such as what characters, the setting of the story, and plot events look like. Also, they may include abstract images such as mental maps of locations in the text, webs illustrating the relationships between information or ideas, and visual representations of abstract thoughts. While many readers use this process internally, it may also be used externally through art, story webs, or graphs that help the reader interpret and organize the information from the text.

Asking questions is a strategy used by highly effective readers to monitor comprehension, make observations, and form predictions. Wilhelm (2001) states that good readers “interrogate the text, the self, and the author before, during, and after reading.” These questions may involve a higher-level analysis of the text (e.g. “Is the author trying to send a message about our own lives through this



character?”), or they may simply involve identifying areas of confusion (e.g. “What in the world does the author means by that?”). According to Ladewig (n.d.), these questions are often shocking to less skilled readers who assume that good readers never get confused while reading and who give up when faced with a difficult text. On the contrary, good readers form questions about what they are reading, and then move on through the text in search of the answers to these questions. Sousa (2005) adds that looking for answers to these questions helps the student learn to focus their reading and forces them to combine their understanding of different parts of the text to come to a logical conclusion.

Summarizing information is a strategy that helps good readers process what they are reading more effectively than if they are attempting to approach the text as a whole. When used correctly, summarizing allows the reader to focus on the key information of the text. It also makes synthesis of old and new material easier as only key information needs to be taken into account. Essentially, summarizing can make a difficult text less demanding by removing the “clutter” of extraneous information.

Perhaps the most directly related skill to metacognition is monitoring understanding and self-correcting. A good reader must continuously know when he understands a text, and when he does not. If this process does not occur, application of any other strategies to increase comprehension will likely not be utilized at the correct times and may result in incorrect inferences based on faulty information when strategies are used.

Also, good readers do not simply read a text and put it aside. Instead, they reflect on its meaning. Why did the author choose to include the scenes he

included? How does this relate to what I thought before I read this text? Does this new information complement my knowledge on this subject, or do I need to change what I previously thought about it? All of these are questions that good readers might ask himself during or after reading a text to push themselves to understand the intent of the author and the text as a whole.

Finally, skilled readers prepare themselves to apply what they have read to their own lives. They take their reflections on the meaning of the text, and use their new knowledge gained from the text to amend their previous knowledge of a given subject. They do not simply read to get through a reading assignment. They actively read to learn.

Mokhatari and Reichard (2002) refer to these types of skills as these “global reading strategies” (Mokhatari & Reichard 2002). Global reading strategies are closely related to the “here and now” component of metacognition. However, in addition to these global reading strategies, Mokhatari and Reichard (2002) include two categories compensatory reading strategies that are used with particularly difficult or important material. Problem-solving strategies include adjusting reading speed, rereading, reading aloud, guessing meanings of unknown words, and paying closer attention to the text. Support reading strategies include taking notes, paraphrasing, asking self questions, consulting other sources, underlining, writing summaries of the reading, and talking about the reading with others. Both of these categories draw from the “long term” component of metacognition. They require the reader to *know* the strategies they can use to actively apply them when needed. When looking at all three types of skills, it is easy to see how complex the reading process of an effective reader can

be and how difficult it could be for those who lack the metacognitive skills to not only apply these skills, but also to recognize when the application of these skills is necessary.

### *Why to Students with Learning Disabilities Often Lack these Skills?*

In 1998, Gersten, Williams, Fuchs, Baker, Koppenhaver, Spadorcia, and Melody released an extensive review of the literature concerning reading comprehension in children with learning disabilities. In this review, they listed several characteristics of students with learning disabilities that relate to reading comprehension. We will look at each of these characteristics individually and examine how they impact the successful application metacognitive reading strategies

The first characteristic discussed by Gersten et al. (1998) is a “weakness in knowledge base.” This characteristic refers to how the failure to correctly learn earlier concepts will lead to problems with later concepts. For example, a student who had difficulty understanding pre-algebraic principles such as x- and y-variables will likely have considerable difficulty understanding how to graph coordinates, solve equations, perform trigonometric functions involving variables, and use variables to perform more abstract functions. Likewise, a student who experienced early difficulties with decoding words will have an increasingly difficult time when longer or more unfamiliar words are included in more complex text. As the demands on the student increase, earlier areas of minor weakness become more severe and have a greater impact in all areas including reading comprehension and metacognitive reading strategy application

(Gersten et al., 1998). If a student has trouble making use of the strategies used by “good readers” early on or does not apply them correctly and therefore does not see their benefits, they will be less prepared and have a smaller set of reading “tools” at their disposal when faced with more complex and demanding texts.

A second characteristic of learning disabled students that impacts their reading comprehension is that they commonly have gaps in their own background knowledge that interferes with their ability to comprehend. Often, material from one subject can be related to another situation or subject. For example, information on stress management learned in a psychology class may be addressed in a reading assignment for a health class. Math concepts or operations may be called for when reading an article including numbers and statistics. And geographical, sociological, or historical knowledge including locations of countries, regional or cultural customs, or general time frames for major historical events may be required when reading a novel for English class. As students with learning disabilities often have difficulty in many of their classes, they may not have understood or remembered everything when they were in class, let alone when they are required to apply and relate their outside knowledge to seemingly unrelated texts. More basically, a teacher may incorrectly assume that a student with a learning disability is familiar with certain vocabulary words or instructions, resulting in an unexpected increase in the difficulty of the tasks for the student if this assumption is incorrect (Gersten et al., 1998). This characteristic makes the application of metacognitive skills more difficult, as not all of the information that the author expects the reader to have is available to the student, leading to problems making predictions,

summarizing, visualizing, asking questions, and reflecting on what they have read.

Gersten et al. (1998) also discuss how gaps in knowledge of vocabulary words also lead to problems in reading comprehension. Lack of general vocabulary knowledge often make direction decoding difficult and time consuming, resulting in less time to actually work on tasks since much of the allotted time for assignments is used simply figuring out the directions. Also, the ability to figure out unfamiliar words or phrases by breaking them apart or looking for prefixes and suffixes is greatly impacted by the overall vocabulary deficits. The word “inanimate” is relatively easy to figure out, if the reader can picture something that is not animated, i.e. not moving, i.e. not alive. However, if students do not know the meaning of “animated” or do not correctly identify that “inanimate” is related to the word “animated,” they are unable to use these clues to decode the meaning of the word. In addition, authors often use novel words that the reader is expected to interpret on their own using their previous knowledge. How likely would it be for someone with a learning disability to be able to figure out what an author meant by referring to young children as “staggerers” if they could not visualize a person “staggering” and had no idea what “staggering” meant? These issues concerning application of background knowledge can have a big impact on reading comprehension and performance and can make the effective application of metacognitive reading strategies difficult to impossible.

The third characteristic that impacts the reading success of students with learning disabilities is an overall lack of story structure knowledge. Gersten et al.

(1998) states that students with learning disabilities have greater difficulty picking out the important information from a story. They have been found to recall less knowledge information from stories than their age-matched peers, specifically with regards knowledge about the characters in the story. Also, they are less skilled at making inferences, and have difficulty identifying the main points of stories, even when given possible choices. Finally, Gersten et al. (1998) mentions that two studies have found that children with learning disabilities have greater difficulty understanding the morals of fables. All of these deficits are closely related to metacognitive reading strategies. If the student is missing out on key information, he will be less likely to be able to relate the information he is reading to outside events, make personal connections to the story, make and revise logical predictions about the direction of the story, visualize characters and their actions, ask appropriate questions of himself while reading, and apply what he has learned to his own life. The incorrect or insufficient recall of information is essentially creating gaps in the knowledge of the text itself from which accurate and logical conclusions are intended to be drawn, negating the effectiveness of a majority of the metacognitive reading skills.

According to Gersten et al. (1998), research has shown that readers with learning disabilities rely on less effective strategies to analyze expository texts. Expository texts are texts meant to provide information or pursued the reader (University of Wisconsin, 2006). Examples of this type of text would include magazine and newspaper articles as well as pamphlets, information sheets, or even written informative or persuasive speeches. Readers who are more aware of expository text structure are able to analyze what they are reading and relate

chunks of like information together. However, readers who are not as aware of the structure of these types of texts may use ineffective strategies that do not relate the sentences to each other, but instead analyze each sentence piece by piece, resulting in an lack of comprehension of the overarching topic of the text (Gersten et al., 1998). When faced with these types of texts, it is crucial for the reader to make predictions often based on a series of related facts. However, if the series of facts never becomes associated in the reader's mind, the application of the metacognitive reading strategy of making predictions cannot be applied in the situations where it is needed, impacting overall comprehension.

The fourth characteristic involves a difficulty with applying the strategies themselves, which Gersten et al. (1998) have termed, "problems in strategic processing." They stress three main problems that students with learning disabilities face when applying the metacognitive reading strategies. The first problem is that the students might not have been taught an appropriate reading strategy for dealing with a given situation or they might have forgotten how to use it. For example, a student may believe that good readers understand what they read simply by reading it once. If this is the case, they may never think to use strategies like rereading unclear passages or even identifying unclear passages. Secondly, they may not know when they should be using the strategies they have learned. Particularly if their background knowledge about a topic is limited, students may not feel that they can relate this story to their own lives, and as a result, they may miss out on activating relevant information, making personal connections, and applying what has been learned. Finally, they may not be motivated to make the effort in applying these strategies. When compared to

ineffectively skimming material or reading but not comprehending, active and skillful reading requires more time and more effort, especially until it becomes automatic. Students with learning disabilities may doubt that metacognitive reading strategies will work for them, may be reluctant to put forth the extra effort required of them, or may have become frustrated with initial difficulties or errors they have faced, making them reluctant to make use of the strategies they have been taught (Gersten et al., 1998).

### *How Can We Teach these Skills to Students with Learning Disabilities?*

Currently, there are many approaches to improving text comprehension in struggling readers. We will address some of the many specific techniques for teaching metacognitive reading strategies and a program that can be used to increase reading comprehension. However, as with any therapy technique or teaching strategy, the key to using these approaches is to identify which one works best for the reader and to use that one.

*Think-Alouds.* Farr and Conner (n.d.) and Wilhelm (2001) support using the “think-aloud” strategy to teach metacognitive reading skills. In this strategy, the reader talks through their thought processes while reading. The main purpose of this program is to encourage children to become more active while they read.

This approach includes three different stages. In the modeling stage, the teacher thinks through the text for the student or students. Those listening are asked to record their observations about what strategies are being used. These strategies are then listed in the students’ own words. During the second stage, coached practice, the teacher prompts students to share what they are thinking



about while they are reading or being read to, encouraging them to use the list of strategies. During the final stage, reflection, students are asked to think about the strategies they have learned and write a letter to someone describing what they have learned and how they are using their new strategies when they read (Farr and Conner (n.d.)).

Ladewig (n.d.) offers several ways to modify the think-aloud teaching process. For example, the teacher could think aloud, but ask the students for assistance in the process, the students could think through the story in a large group with the teacher or other students providing feedback and suggestions, or the students could do think-alouds in writing using post-it notes or a journal. Variation of strategies can help make the learning process more interesting and can be helpful in determining the specific needs and interests of each student.

*Paraphrasing for Comprehension.* Sousa (2005) suggests another approach to reading comprehension, paraphrasing for comprehension. This approach “encourages active participation, provides for mental, oral, and written rehearsal of newly learned material, enhances comprehension and retention” and “develops reading, communication, and creative skills” (Fisk & Hurst, 2003). While this approach does not teach students to use all the metacognitive reading strategies, it does allow students to develop their summarizing and paraphrasing skills.

This approach consists of four steps. During the first step, the teacher reads the text aloud. The students follow along in their own texts, and have an opportunity to discuss unfamiliar vocabulary, the main idea of the text passage, and the author’s tone. During the second stage, students reread the text on their

own and write, in their own words, notes about the main ideas and supporting details of each paragraph. During the third stage, the students use only their notes to write their paraphrased version of the text in paragraph form. The students must write their paragraphs in the same style as the author. For example, if the author is writing very formally, the student must also write formally, and if the author is being humorous, the student must also write using humor. Then, during the final stage, the students share their paraphrased versions of the text with each other and also explain how their own writing reflects the author's voice (Fisk & Hurst, 2003).

While the act of taking notes on the text and paraphrasing each paragraph does force the student to actively approach the text, the four-step process it is likely too time consuming to be a practical long term reading strategy. However, it seems to be an excellent approach to teaching the strategy of summarizing while reading. Also, it has the additional benefit of teaching writing skills that will be useful later in life.

*Math approach.* Teachers and parents can also use math to improve and practice metacognitive strategies. Sibley (2002) suggests combining math problems with the think-aloud strategy proposed by Farr and Conner (n.d) and Wilhelm (2001). While Sibley (2002) provides several specific math activities to teach and practice these strategies, the ideas carry over to almost any type of math problem. Some suggestions include having the student talk through estimating the time they need to get up in the morning or talk through calculating a tip at a restaurant. Not only does this practice increase their metacognitive and

critical thinking skills, it also helps them realize that there are many real world applications for the math skills they are learning in school.

*The Nancibell® Visualizing and Verbalizing Program for Language Comprehension and Learning® (V/V®).* The V/V® also targets one specific metacognitive strategy. This program has a more limited application specifically people with “weak concept imagery.” These individuals are able to pick out specific details from a text or a conversation, but are unable to form a good overall concept for what is being said or written. They may have to reread a text several times to try to figure out what the whole text is about, they may be labeled poor listeners because they may respond to only part of a question or re-ask the same question over and over again, not realizing that their question has been answered, they may have difficulty organizing their spoken language into cohesive thoughts that are easy for others to follow, instead speaking in a scattered manner or not at all, and their writing may be very disorganized and nonspecific (Lindamood-Bell Learning Process, n.d).

The program focuses on “making movies while you read” (Bell, 1986). It encourages the student to picture, in detail, what he is reading and to describe his mental picture out loud. Although the manual for this program is very expensive, learning centers often use this program to improve comprehension and in-services are held for those who are interested in using the program. Also, this program stresses that quick improvement can be made by students who learn to use the visualization and verbalization strategies (Lindamood-Bell Learning Process, n.d).

*Other approaches.* In addition to these programs, there are many other approaches to teaching metacognitive reading strategies and improving text comprehension. The TELLS strategy, the MULTIPASS strategy, and strategies that incorporate peers as teachers are free to learn and use and are frequently suggested ways of improving comprehension (Williams, 2000). El-Hindi (1997) suggests that journaling or keeping “reading logs” is an excellent way for college students to practice and improve their metacognitive thinking skills as well as their reading comprehension. The Internet is a great source of these many approaches, although they are often not supported by research. Until further research in the area of metacognition reveals a clearly superior approach to teaching metacognitive strategies, informal assessment and observation of which approaches do or do not work with a student appears to be the only and/or best ways of improving reading comprehension and academic performance.

### *Does Metacognition Impact Life Outside of Reading?*

The application of metacognition is not limited to the area of reading. The metacognitive deficits of students with learning disabilities can have a large impact on overall academic success. Metacognition is an essential tool in helping students establish a well-developed concept of a their learning disability and in figuring out what they need in order to succeed.

College is often a particularly difficult time for students with learning disabilities. These students are more likely to fail college courses and drop out of school than their non-learning disabled peers (Trainin & Swanson, 2005). Whereas in high school, an IEP may have been provided and necessary

accommodations were enforced, in college, the student must take more responsibility for arranging and enforcing accommodations. Also, as college courses often require application of more abstract knowledge and less fact regurgitation, the cognitive demands required of the student become more involved.

In addition to the increasing academic demands of college, all college students must adapt to greater independence and responsibility. While in high school, teachers knew each of their students and took interest in their successes and failures; college can often be a different story. Larger, more impersonal classes, large amounts of required independent reading, and a lack of the support or discipline that parents may have provided during high school mean that students must choose figure out their own ways to succeed. Student must decide how to manage their time, how to study, where to seek out advice, and when to use comprehension strategies. “Here and now” metacognitive processing must be used to monitor overall academic performance and progress, and “long-term” processing must be used to plan what needs to be studied, how and when to study, who to seek help from, and what strategies to use.

Unfortunately, individuals with decreased metacognitive skills often have trouble with self-assessment (Kruger and Dunning, 1999). As a result, a student with low metacognitive ability may read a research article for class, but misinterpret the main point of the research. As they proceed through the article, they may or may not catch their error, depending on how actively and accurately they are reading. As a result, they will not only have potential reading errors due to their learning disability, but they may also never have realized that they did

not understand the article, never have sought help from anyone else to try to figure out what the article meant, and never even realize that they missed anything on a test about the article. Without using metacognitive skills to monitor and control performance in college, a student may never realize he or she is having any trouble in school until grades come out.

When facing almost any disorder, knowledge is power. Stroke patients should understand their limitations, their strengths, and the accommodations they need to function in the real world. A person with panic disorder should know what is going on when a panic attack occurs, what sets them off, and again, what accommodations they need to be successful in the real world. In the same way, students with learning disabilities need to know where their troubled areas are and analyze themselves to determine how best to deal with them.

### **Part III: Implications**

Speech-language pathologists, teachers, parents, and, most importantly, students with learning disabilities, must deal on a daily basis with the problems caused by poor metacognitive skills. These skills can make the difference between academic success and failure. Realizing where gaps in comprehension lie and knowing strategies to fill in the missing or inaccurate information may be the key to good reading comprehension as well as a successful academic career for students with learning disabilities.

However, while it is easy to *say* that improving metacognitive skills the way to “fix” poor reading comprehension and poor academic performance, it is much more difficult to actually *do* this. According to Mokhtari and Reichard

(2002), researchers believe that it may take as long as one year or more to teach students to become more strategic readers, and although there are many websites, articles, and books written on approaches to teaching metacognition and metacognitive reading strategies, statistically-based research regarding these approaches is difficult to find.

Although more research is needed with regards to the effectiveness of specific approaches to teaching these skills, what is apparent is that, if a child has decreased metacognitive ability or a lack of knowledge of metacognitive strategies, this child will likely experience difficulty with reading in order to understand and learn. It is only by researching and attempting to learn more about the fascinating area of metacognition that we can hope to make progress in treating and in teaching these students, so that they may become more successful readers and, most importantly, more successful learners.

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